IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. Cancel

2. (Previously Presented) A masking aperture for an illumination system to provide controlled illumination of a photomask with two dimensional features comprising:

a translucent substrate;

a half-tone dithered image on the substrate, said half-tone dithered image comprising an array of pixels arranged in accordance with features on said photomask to be illuminated,

wherein each pixel is a clear or opaque type, said clear and opaque pixels for respectively passing and blocking incident light, wherein the number, size, and type of the pixels are chosen in accordance with:

(a) the wavelength of light used to illuminate the photomask, and

(b) the size and shape of the features of the photomask.

3. (Previously Presented) A masking aperture for an illumination system to provide controlled illumination of a photomask with two dimensional features comprising:

a translucent substrate;

a half-tone dithered pattern on the substrate, said half-tone dithered pattern comprising an array of pixels arranged in accordance with features on said photomask to be illuminated,

wherein the half-tone dithered pattern comprises an array of diffraction elements and each diffraction element is a dithered image of clear or opaque pixels.

4. (Original) The masking aperture of claim 3, wherein each diffraction element comprises an n x n dithered matrix of pixels, the intensity of each element is defined by the number and type of pixels in its dithered matrix and wherein the pixels in each matrix are dithered to avoid artifacts.

5. (Original) The masking aperture of claim 3, wherein the relative intensity of each element is defined by a recursion relationship where:

$$D^n = \begin{vmatrix} 4D^{n/2} + D_{00}^2 U^{n/2} & 4D^{n/2} + D_{01}^2 U^{n/2} \\ 4D^{n/2} + D_{10}^2 U^{n/2} & 4D^{n/2} + D_{11}^2 U^{n/2} \end{vmatrix}$$

where:

$$U^n = \begin{vmatrix} 1 & 1 & \dots & 1 \\ 1 & & & \\ \cdot & & & \\ \cdot & & & \\ \cdot & & & \\ 1 & & & \end{vmatrix}$$

6. (Original) The masking aperture of claim 5, wherein the matrix of pixels of each element comprises an 8 x 8 matrix and the relative intensity, D^8, comprises:

$$D^8 = \begin{vmatrix} 0 & 32 & 8 & 40 & 2 & 34 & 10 & 42 \\ 48 & 16 & 56 & 24 & 50 & 18 & 58 & 26 \\ 12 & 44 & 4 & 36 & 14 & 46 & 6 & 38 \\ 60 & 28 & 52 & 20 & 62 & 30 & 54 & 22 \\ 3 & 35 & 11 & 43 & 1 & 33 & 9 & 41 \\ 51 & 19 & 59 & 27 & 49 & 17 & 57 & 25 \\ 15 & 47 & 7 & 39 & 13 & 45 & 5 & 37 \\ 63 & 31 & 55 & 23 & 61 & 29 & 53 & 21 \end{vmatrix}$$

7. (Original) The masking aperture of claim 4, wherein the matrix of the diffracting elements is selected from the group consisting of 2 x 2, 4 x 4, 8 x 8, 16 x 16, 32 x 32 and 64 x 65.

8. (Previously Presented) The masking aperture of claim 3, wherein the elements generate one or more zones of controlled intensity.

9. (Original) The masking aperture of claim 8, wherein the zones are symmetrical about the center of the masking aperture.

10. (Original) The masking aperture of claim 9, wherein the zones have one shape selected from the group consisting of circles, squares, rectangles, and ellipses, rings, circular rings, square rings, or combinations thereof.

11. (Original) The masking aperture of claim 10, wherein the selected shape is a stepped square.

12. (Original) The masking aperture of claim 10, wherein the selected shape is an ellipse and the major axis of each ellipse is aligned at a 45-degree angle with respect to the center of the masking aperture.

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15. (Original) A masking aperture for an illumination system to provide controlled illumination of a photomask with two dimensional features, comprising:

a translucent substrate;

an array of diffraction elements on the substrate and each diffraction element comprising a half-tone dithered image of clear and opaque pixels;

each half-tone image comprising an array of pixels, each pixel of a clear or opaque type of respectively passing or blocking incident light, wherein the number, size, and type of the pixels are chosen in accordance with:

(a) the wavelength of light used to illuminate the photomask, and

(b) the size and shape of the features of the photomask, for generating a continuous illumination intensity pattern on the photomask with illumination intensity at any location controlled by the half-tone dithered image.

16. (Original) The masking aperture of claim 8, comprising a zone with a square ring.

17. (Original) The masking aperture of claim 16, wherein the zone comprises four translucent slots.

18. (Original) The masking aperture of claim 16, wherein the intensity in the square ring varies from 0% to 100%.

19. (Original) The masking aperture of claim 16, wherein the intensity outside the square ring varies from 0% to 99%.

20. (Original) The masking aperture of claim 16, wherein the square ring is combined with one or more zones having a shape selected from the group consisting of square, elliptical, ring, square ring, circular ring, or combinations thereof.

21. (Original) The masking aperture of claim 8, wherein the zones comprise an annular ring and one or more zones with shapes selected from the group of shapes consisting of square, elliptical, ring, square ring, circular ring and combinations thereof.

22. (Previously Presented) The masking aperture according to claim 1, wherein said array of pixels is arranged to cause radiation that passes through a center of said masking aperture to be attenuated more strongly than radiation that passes through a peripheral portion thereof.

23. (Previously Presented) The masking aperture according to claim 1, wherein said array of pixels comprises a first plurality of pixels that are substantially transparent to illumination radiation of said illumination system and a second plurality of pixels that at least reflect or absorb illumination radiation of said illumination system.

24. (Previously Presented) The masking aperture according to claim 23, wherein said second plurality of pixels comprise a metal deposited on said translucent substrate.

25. (Previously Presented) A masking aperture according to claim 24, wherein said metal deposited on said translucent substrate comprises chromium.

26. (Previously Presented) A masking aperture according to claim 25, wherein said translucent substrate comprises fused silica.

27. (Currently Amended) A masking aperture ~~according to claim 1, further comprising~~ for an illumination system to provide controlled illumination of a photomask with two dimensional features comprising:

a translucent substrate;

a half-tone dithered pattern on the substrate, said half-tone dithered pattern comprising an array of pixels arranged in accordance with features on said photomask to be illuminated; and

an anti-reflection film deposited over at least one of said translucent substrate and said half-tone dithered pattern.